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ABSTRACT

This report contains descriptive summaries of the results of the Inter-Project/Inter-Country Study Visits on Educational Technology sponsored by the UNESCO Asian Programme of Educational Innovation for Development (APEID) to provide an opportunity for specialists in educational technology from the participating countries to: (1) make on-site studies of projects related to the design and management of educational technology programs and the development of low-cost, appropriate educational materials and teaching devices; (2) synthesize experiences and ideas and discuss issues and problems relating to the development of low-cost, appropriate educational materials and the use of local resources; and (3) prepare re-orientation plans for ongoing projects and programs for the development of educational materials in participating countries. An introduction to the program is followed by summary reports by the participating countries, i.e., Bangladesh, India, Indonesia, Nepal, Papua New Guinea, the Philippines, Sri Lanka, and Thailand. The background of the institutions, projects, and programs visited in particular countries and suggestions for the re-orientation of ongoing national projects and activities are then presented. A list of participants, with the addresses of contact persons, is included. (Author/JL)

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ASIAN PROGRAMME OF EDUCATIONAL INNOVATION FOR DEVELOPMENT APEID

Inter-country Co-operation in Educational Technology

Report of APEID Inter-project and Inter-country Study Visits on Educational Technology

8 October – 6 November 1979

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The Inter-project and Inter-country Study Visits were held jointly by:

the Bureau of Elementary Education, Ministry of Education and Culture, Manila, Philippines;

the Curriculum Development Centre, Ministry of Education, Bangkok, Thailand;

the Centre for Educational Research, Innovation and Development, Tribhuvan University, Kathmandu, Nepal;

the National Council of Educational Research and Training, New Delhi, India;

and

the Asian Centre of Educational Innovation for Development (ACEID)
Unesco, Bangkok

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CHAPTER I

INTRODUCTION

Introductory note

The innovations in both formal and non-formal education programmes initiated in the Member States and promoted under the Asian Programme of Educational Innovation for Development (APEID) are designed to increase education's relevance and contributions to :

i) integrated rural development;

ii) development of productive skills relevant to economic development;

iii) universalization of education at the early school levels and functional education for out-of-school youths and adults;

iv) better health and nutrition; and

v) national unity and international understanding and co-operation.

Inter-country exchange of experiences is one of the major modes of operation under APEID, contributive to increasing the flow of information and insights among the countries and providing opportunities for co-operative actions and for synthesis of experiences.

In view of the scarcity of resources in most countries of the region, the value of international co-operation in education could be greatly enhanced, if the activities are designed to stimulate development, the utilization of low-cost/appropriate educational materials, the use of the environment and local resources, and the use of new educational techniques. Apart from being economical, the approach has also the added advantage of relating education to real-life situations of the learners.

Background and specific objectives

The various activities so far organized in this direction have focused on a systematic approach to review the current efforts and experiences of the countries in exploring new strategies and methods of designing low-cost/appropriate educational materials as well as in mobilizing unused and under-utilized local resources in order to ensure an effective implementation of educational programmes supportive of the national development goals.

As early as December 1977, a Regional Workshop in Educational Technology with Special Reference to the Development of Low-cost Educational Materials was organized in Malaysia with the objectives :

i) To review the present status of developing low-cost educational materials;

ii) To prepare guidelines for designing, development and evaluation of low-cost educational materials; and

iii) To develop proposals for future re-orientation and strengthening of national efforts in this area.

As a follow-up of this Regional Workshop, a series of national workshops were conducted in the participating countries of APEID and the first Sub-regional Workshop in Educational Technology was held in Nepal in 1978 for synthesizing the various national experiences.

The present activity of APEID -- the Inter-project/Inter-country Study Visits on Educational Technology -- was intended to contribute to :

i) Sharing of ideas and experiences among the participating countries;

ii) Providing opportunities for discussions on major issues and problems;

iii) Generating interest in other countries'projects through exchange of first-hand knowledge and experiences; and

iv) Facilitating exploration of ways and means for resolving common issues and problems.

The specific objectives of the Study Visits were to provide an opportunity for specialists in educational technology:

i) to make an on-site study of projects on designing and management of educational technology programmes and, in

particular, development of low-cost /appropriate educational materials and teaching devices;

ii) To synthesize experiences and ideas and discuss issues and problems relating to the development of low-cost/ appropriate educational materials and the use of local resources; and

iii) To prepare re-orientation plans for on-going projects and programmes for the development of educational materials in the participating countries.

Organization of the Study Visits

The following Associated Centres of APEID acted as hosts during the Study Visits :

1. The Bureau of Elementary Education, Ministry of Education and Culture, Philippines
2. The Curriculum Development Centre, Ministry of Education, (in collaboration with the Department of Technical and Economic Co-operation), Thailand
3. The Centre for Educational Research, Innovation and Development, Tribhuvan University, Nepal
4. The National Council of Educational Research and Training, India

The Study Visits took place in the four host countries on the dates shown below :

Dates	Countries
8 - 13 October 1979	Philippines
14 - 20 October 1979	Thailand
21 - 27 October 1979	Nepal
28 October - 6 November 1979	India (including a synthesis meeting)

Participation

A total of 12 participants, one each form Bangladesh, Indonesia, Papua New Guinea, Sri Lanka and two each from India, Nepal, Philippines, and Thailand, participated in the Study Visits. ACEID was represented by the Assistant Programme Specialist in Educational Technology for the synthesis phase of the Study Visit. A list of the participants is given as Annex I.

Methods of work

During the Study Visit in the country, the head of the host Associated Centre and the participants from the host country served as leaders of the Study Visit team. In each country visited, a reporting committee, comprising equally of participants from the host country and participants from the other countries, was set up. This committee discussed and collected the impressions and reflections of the participants and prepared the initial draft report pertaining to that visit.

Final report

The draft report of the Study Visit which contained the synthesis of the country reports and the discussions during the synthesis meeting was presented at the concluding session of the Study Visits on 6 November 1979. It was adopted with some modifications, which have been incorporated in this final report.

CHAPTER II

SUMMARY OF COUNTRY REPORTS

The write-ups in this chapter are the summary reports by country as presented by the participants of the Study Visits.

BANGLADESH

Bangladesh, with a population of more than 80 million living in an area of fifty-five thousand square miles, has little over forty thousand primary schools and eight thousand secondary schools. Teacher-student ratio varies from 1:60 to 1:20 depending on the area in which the schools are situated. Drop-out rate at the primary level is about 70%. More than 30 per cent of the teachers are not trained.

To overcome the deficiency of the teachers and to supplement their teaching, the use of instructional materials like radio and television has been planned and will shortly be implemented. In addition, provision has been made to supply both the software and hardware, such as textbooks, teacher's guides, teaching materials like maps, charts, diagrams, graph boards, film strips and other equipment.

It has been planned to set up workshops for the preparation of inexpensive educational materials by teachers and students in the villages as well as in the city. Replacement of teachers by machines has been discarded by Bangladesh. Because of the continuous changes in the present-day world, Bangladesh wants to keep pace with the modern trend, as far as economically possible. Bangladesh also realizes that in the modern world both inexpensive as well as some expensive but useful equipment such as tape recorders, slide projectors, radio, TV should also be used for teaching.

As the teachers have not yet learnt how the resources at their disposal would be used in various classroom situations, they have to be given regular in-service training.

In order to overcome the shortage of equipment in the schools, the Audio-Visual Education Centre and the Bangladesh Educational Equipment Development Bureau were established, and

Dacca University started the Curriculum and Instructional Material Development Centre in the Institute of Educational Research (IER). The Textbook Board and the Department of Industrial Arts in IER have also produced some charts and prototype materials that can be used in the classroom.

A scheme of school broadcast programme which will facilitate the improvement of education in the 1,000 secondary schools all over the country is going to be started soon. Radio Bangladesh will broadcast school curriculum-based educational programmes. The curriculum content will concentrate on national language, environmental studies and work-oriented education.

As there is a great dearth of well-trained teachers, master teachers will be used for enrichment of classroom teaching through television. Through television these master teachers will be in a position to appear simultaneously in thousands of classrooms.

In addition to the above projects, the British Council, the Bangladesh Shishu (Children) Academy and UNICEF started projects for the production of inexpensive educational materials (prototypes) and some of them are in mass production now providing new employment to hundreds of people.

The Bangladesh Science Museum is responsible for educating, informally or non-formally, the students, adults and drop-outs.

INDIA

Education in India is a state responsibility and within the framework of general advice of national bodies like the Central Board of Secondary Education and the National Council of Educational Research and Training (NCERT), The State defines its own educational policies and designs, produces and distributes educational materials.

Textbooks are main learning materials used by students and teachers. Wherever facilities exist, textbooks are augmented by teaching-learning aids like pictures, charts, models, tapes, radio and television lessons. Realizing the importance of textbooks in the educational system, most States have nationalized the production and publication of textbooks. NCERT indirectly guides in the production of textbooks and in the designing of curricula; it also produces prototype textbooks under its own auspices. The States are free to adopt these curricula or books which suit their needs..

Textbooks are provided free of charge to certain children in the primary schools in some States. But in most States the books are purchased by the students of classes VI to XII. These may be subsidized, though, by the Government by making available paper at lower cost or by printing them at their own presses.

Educational programmes for school children are being broadcast from 35 stations in India and are further relayed by 25 auxiliary stations. The aim of these broadcasts is to help teachers and students with new and additional knowledge using the best possible techniques to facilitate learning.

As in the case of textbooks, the educational broadcasts are also designed, produced and transmitted in different languages from various stations. The initiative for educational broadcasts rest mainly with Akashvani (All India Radio), but the producers work in close consultation with educationists at all levels of planning and production. Broadcasts are also made for teachers mostly on a weekly basis to familiarize them with latest educational methodologies and practices.

Most educational broadcasts are directed to children in classes V and upward, though the tendency now is to extend the broadcasts to the primary schools.

The broadcasts for schools are also prepared by some special agencies. The Central Institute of Indian and Foreign languages in Hyderabad, for example, has prepared special packages for teaching English. The same are broadcast from several stations of Akashvani and are very well received in the field.

Akashvani also extends facilities for special projects on request. Some of the examples in this connection are: extension of multi-media package for in-service training of teachers in Kerala State, and an experiment in language teaching being conducted in Rajasthan State by the Centre for Educational Technology.

In addition to the programmes for students and teachers, Akashvani has programmes for informal education of farmers, industrial workers, children, women, youth and rural folk.

Use of television in the country is relatively new and restricted. The Doordarshan (Television) telecasts educational programmes from Delhi, Madras, Bombay, Srinagar, Jaipur, Raipur and Amritsar. The telecasts vary from 2 to 16 hours a week.

Regarding programme production, the policy of Doordarshan is similar to that of Akashvani as both organizations were under the same banner till very recently. As in the case of Akashvani, Doorarshan also transmits several programmes on agriculture, health, hygiene, nutrition, family welfare, social education, national integration and development, and other cultural activities.

In this connection, contribution of the Space Application Centre (SAC) of the Indian Space Research Organization (ISRO) needs a special mention. ISRO/SAC worked partially for production and fully for transmission of educational programmes in several spots of rural areas in India during 1975-76 on an experimental basis. It continues its experimentation in communication for rural areas in various fields and is engaged in the evolvement of low-cost and relevant equipment to meet the country's needs. It also produces a half-hour daily programme in one of the Indian languages for a specific area in Gujarat.

Only a few agencies like NCERT and State Councils of Educational Research and Training produce films for use in formal education. The number and utilization are as yet limited. These institutions also produce materials like slides, posters and charts for utilization in the classroom. However, these are produced either as prototypes or for training of teachers in audio-visual education. The Ministry of Information and Broadcasting produces forms for general education of the public. These are shown through movie houses all over the country.

Several universities and few Boards of Secondary Educatio offer correspondence courses to home-bound students. Learning materials are specially prepared by these agencies for such students. Some of these agencies also incorporate radio broadcasts in their learning packages.

The Centre for Educational Technology of NCERT and the Educational Technology Cells in States (institutions set up during the last five years in the country) also produce audio-tapes, tape-slide packages and films as prototypes and for training. All these materials are available to schools in different parts of the country.

INDONESIA

Achievement and programme

The Government has made efforts within the reach of its capability to realize the programme in education. For primary education, which emphasizes the spreading of learning opportunities for school-age children, the Government has built a great number of school buildings in remote areas and villages. At the secondary education level, the development of school buildings is meant for the increasing number of children who have finished their primary level. In this respect the provision of educational facilities for all forms and levels of education has been increased and developed.

Learning and teaching aids and tools

Up to 1979, the Government has provided 71,330 sets of learning and teaching aids and tools which are intended for kindergartens, primary schools and schools for handicapped children. Plans have been made that during the coming five years 40,000 sets of those aids will be produced. Meanwhile learning and teaching aids as well as tools for lower and upper secondary schools have reached 28,830 sets.

School books

For primary education,275,520,500 textbooks have been published and distributed. In addition, schools have also been provided with various titles of library books which amount to 47,539,000 copies. In the next five-year programme, 273,700,000 main textbooks for primary education and 64,000,000 copies of library books and bulletins will be produced. In the third five-year programme, 52,000,000 copies of textbooks and 3,500,000 copies of library books will be supplied to lower and upper secondary schools.

Educational media

The Directorate of Educational Facilities has been set up for the general specification and standardization of educational media to be used in schools, including the specification and standardization of the supporting facilities needed. The Centre of Communication Technology for Education and Culture, a unit within the Department of Education and Culture which is in charge of promoting the utilization of communication technology in education, has developed some educational software in the form of tapes and cassettes

to support the in-service training programmes for primary school teachers and programmes for the development of non-formal education. Some videotapes, cassettes, films, slides and filmstrips have also been developed for various educational purposes. For limited instructional purposes a number of lower and uper secondary schools have used educational media such as radio sets, tape recorders/ players, OHP, and slide projectors donated by the community, purchased by the school or provided by the Government. In some teacher training centres in the capital cities of some provinces, there are also video-cassettes utilized for micro-teaching purposes.

Innovative efforts in progress

The Directorate of Educational Facilities within the Directorate General of Primary and Secondary Education is preparing prototypes of educational media programmes for primary as well as secondary schools, The Centre of Communication Technology for Education and Culture also has a number of activities aimed at promoting the utilization of communication technology for education:

i) Establishment of a National Task Force responsible for the production and development of educational films, educational television programmes, slide and filmstrips and the conducting of training in the production of those materials. This Task Force is also responsible for the production of educational radio materials for in-service teacher training and for the open school experimental programmes.

ii) Establishment of several provincial Task Forces responsible for the implementation of educational radio programmes to help in-service training for teachers in remote and isolated areas, and also the conducting of training programmes for the general public.

iii) Development of multi-purpose kits, containing learning and teaching aids and tools which are compact, relatively strong, adjustable and reasonably low in price (through the utilization of non-imported or home-made materials).

NEPAL

The need for the use of educational materials for classroom teaching in schools of Nepal has been felt more strongly after the implementation of the National Education Plan in 1971. It has created a climate of awareness among the educationists and teachers of the importance of various media and materials for effective teaching. Since then attempts have been made to emphasize the development and use of low-cost/simple educational materials as a part of the teaching-learning process.

The Curriculum, Textbook, Supervision Development Centre (CTSDC) and the Science Equipment Centre of the Janak Educational Materials Centre, within the limits of their means and resources, produce from time to time some visual aids, charts of silk-screen process, prototypes of simple science equipment for lower secondary and secondary classes. One of the responsibilities of CTSDC is the educational radio-service programme. School broadcast has four programmes a week, each of thirty minutes' duration; two are general programmes and the other two are for teachers. All these programmes directly or indirectly emphasize the need for improvisation of low-cost/simple educational materials by teachers, students and the community.

The Centre for Educational Research, Innovation and Development (CERID) often initiates various activities to promote the development, design and use of low-cost/simple educational materials. Some of the activities undertaken by CERID are as follows:

1. Lahachok Innovative Project - The project was conducted with the aim of linking education with the developmental needs of the community to involve local people in the overall educational activities.

2. Use of local materials in science teaching - science teachers in various districts of the country were exposed to the methods of designing, developing and using low-cost/simple educational materials from the local environment.

3. National and Sub-regional Workshops in Educational Technology - The focus of the workshops were on the development and production of low-cost/simple educational materials and on the exchange of experiences.

The Institute of Education (ICE) of Tribhuvan University plays a big role in disseminating the ideas and knowledge of developing low-cost educational materials for use in classroom teaching through teacher training.

The main problem in the design and development of educational materials is the lack of skilled manpower. Financial constraint is also one of the problems which stands in the way of the development and use of educational materials. It has been recognized that, whatever the problem, the concerned Centres should have the responsibility of monitoring these activities for dissemination of ideas and of exploiting the technical know-how of their own local conditions with the best results. These Centres (CTSDC, CERID, IOE) should help the teachers in the task of getting the relevant

and necessary guidance from time to time. Because in rural areas teachers are mostly under-qualified and their competency level in teaching a subject is very low, low-cost/simple educational materials could be used to supplement self-instructional materials.

PAPUA NEW GUINEA

Introduction

The Department of Education and Culture of Papua New Guinea is involved in the design, development and production of its educational materials through the Curriculum Unit.

The revision and production of new syllabuses for grades I to X has been completed and teacher's guides and student materials are being prepared to complement them.

The emphasis of production is becoming oriented towards community (primary) school education. The materials at community school level have tended to be almost exclusively for teachers. There are two reasons:

1. Pedagogical - The language structure for student materials should relate directly to the English programme. More to be prepared.
2. Logistical - The volume of printing and providing replacements is beyond the Department's present resources.

Design development and production

A Production Centre for Educational Materials with a staff of seven has silk-screen presses, woodwork equipment and small plastic moulding machine. Equipment being produced consists of materials that are silk-screen printed on paper, card or plywood plus other wooden equipment.

Attempts to have materials made at provincial vocational centres have not always proved successful. These centres lack administrative staff and often prefer their students to learn a variety of skills rather than be involved in mass production.

Locally produced materials

Locally produced materials consist of:

1. Materials to support on-going projects;

2. Materials to provide classroom support/reference over several grade levels;
3. Materials to provide classroom support/reference at specific grade levels;
4. Materials used for direct teaching of the syllabus; and
5. Materials designed to incorporate cultural activities and encourage community participation.

The findings of an Indigenous Mathematics Project must be taken into account when materials design and production for mathematics begins at the provincial level.

Use of local resources

Requests come from national syllabus committees or workshops, senior curriculum officers or officers in the Materials Section of the Curriculum Unit. It is expected that there will be a much greater involvement of provincial teachers. An indigenous readers programme in the Trobriand Islands involves teachers in writing and the local community in production and evaluation.

The use of local natural resources is included in the science syllabus for community schools, the primary mathematics checklist and the home economics booklets "Improvization of Household Equipment"

Using materials in the classroom

Community school classrooms are generally equipped with only very basic furniture and teaching materials. The urban schools have received adequate supplies, while the isolated schools often receive very little.

The situation is improving. Many teachers attempt to improve their classroom environment with charts and pictures. Chalkboards and printed materials still predominate.

Most teaching aids used in the classroom belong to the younger teachers who have bought them from their teachers' colleges.

The next step is to arrange adequate in-service training. At present this is accomplished in two ways, through annual in-service weeks and through established subject groups. The large numbers of teachers involved, the needs of each subject area and the short time available mean that eventually this problem may well have to be solved by individual provinces.

PHILIPPINES

The dearth of educational materials is pointed out by several studies/researches made on the Philippine educational system as one of the causes of ineffective instruction. Educators and school administrators, aware of this critical problem, have focused their attention on the development and utilization of low-cost relevant educational materials, for a developing country like the Philippines cannot afford the use of sophisticated technology in most classroom instruction. Financial constraint calls for low-cost, simple and locally prepared educational aids.

To effect this programme of designing, development and production of low-cost educational materials, national as well as regional workshops were held in the thirteen regions of the country. These regional workshops were attended by key elementary grade teachers who were selected on the basis of experience and competence in creative writing, preparation of audio-visual/instructional materials and mastery of the curricular contents of the elementary education learning continuum. The afore-mentioned workshops were managed by the regional training staff and consultants/resource persons from the Bureau of Elementary Education. These regional workshops aim to:

1. Prepare support instructional materials in communication arts, both Pilipino and English, Mathematics and Social Studies;
2. Maximize the utilization of indigenous/locally available resources in the preparation of low-cost instructional materials to depict cultural heritage and capabilities in the region; and
3. To micro-validate the phototype materials for possible multiplication and distribution in the regions/country.

The key elementary teachers who were participants of these workshops, under the guidance of the division educational media supervisors/coordinators, are the people spearheading the training of other teachers in the development of low-cost educational materials. The Experimental Elementary Education Programme (EEEP) which is presently being tried out in 126 schools in the country calls for new educational materials so that books, guides and manuals geared to the needs of the programme were prepared, produced and distributed to the 'try-out' schools.

The Bureau of Elementary Education of the Ministry of Education and Culture has undertaken projects which will further enhance the use of low-cost educational materials in classroom instruction. The 'Do-It-Yourself Learning Kit' consists of tools

which may be used in the production of educational materials accompanied by a compilation of instruction sheets giving the procedures on how to develop the selected examplar educational materials which have been micro-validated and tried out. A book of folk songs, folk tales, legends, folk dances and games inherent in the different regions of the country are also printed for classroom use. They are written in two languages, Pilipino and English. These books serve as resource materials in the teaching of the different subject areas, such as English, Filipino, Social Studies, Physical Education and Music. Books further aim to preserve the culture of the Pilipino people and to help instil in the children's minds their national identity.

The proper utilization of these developed low-cost educational materials generate solutions to local economic and educational problems in most of the schools throughout the country.

SRI LANKA

The year 1945 is an important landmark in the history of education in Sri Lanka. The Free Education Scheme which is consider unique in many respects was introduced in that year. Since then there has been a rapid expansion in educational facilities at all levels. State expenditure on education increased by nearly fivefold. More and more state senior secondary schools (known as Central Schools) were opened in provincial towns. Science education which was restricted to few senior secondary schools or colleges in the city was extened to provincial and rural schools. Facilities for vocational and technical education were also introduced to provincial towns.

With the expansion of educational facilities, demand for qualified teachers, science equipment, teaching aids and audio-visual equipment also grew unprecedentedly. It is natural that a developing country like Sri Lanka cannot meet this demand. She has to utilize her limited resources to the maximum capacity.

Under such circumstances the instructional system had to be supplemented by educational technology facilities. Educational innovations which demand increasing use of educational technology methods are as follows:

1. Introduction of curriculum changes and new teaching methods, specially at the primary level;
2. Introduction of new subjects such as integrated science, etc.;

3. Introduction of subjects with a practical bias. These changes in the instructional system created a demand for new techniques in teaching, involving extensive use of audio-visual and other instructional aids, such as low-cost science equipment kits.

The present paper deals mainly with the production of educational materials, especially science equipment and science kits.

Brief historical background of the production of science equipment

In view of the vital importance of science education in the social and economic development of the country, the Government of Sri Lanka expanded its science education programme. The availability of science equipment is an essential factor in making science education practical and meaningful. About 90% of the science equipment needed for the science education programmes are imported and involve foreign exchange. Delivery periods are of the order of 6 - 9 months. In order to ensure regular supplies, an assembly and production unit for science equipment is a necessity. Therefore the Government of Sri Lanka established a Science Equipment Production Unit in 1965 at Veyangoda (about 23 miles from Colombo) adjoining the Science Teacher Training College.

Designing and production of science equipment

With the introduction of integrated science course to the school system, the demand for science equipment increased enormously. For a successful implimentation of this new science course, necessary equipment and materials have to be supplied to about 7,000 schools. As the curriculum of the Integrated Science Course is based on active student participation, traditional science equipment hitherto used in schools are not always suitable; nor is it possible to supply them on such a large scale. Equipment requires for this new integrated science course has to be designed anew, or the traditional equipment has to be modified suitably to meet the present requirements. To meet this situation, the Ministry of Education of Sri Lanka has established a design unit at the Curriculum Development Centre. The Equipment Design Unit, in consultation with curriculum writers, designed and produced prototypes for try-outs. These prototypes are tried out at schools and in teachers' in-service workshops to get teacher feed-back. Prototypes are then re-designed or modified if necessary and sent to the Science Equipment Production Unit for mass production.

Audio-Visual Unit.

The non-availability of locallly made filmstrips, documentary films and slides,etc. has prevented the extensive use of the above-mentioned audio-visual aids in the instructional system of Sri Lanka. However, these aids are used fairly widely in the In-service Vocational Institution and at in-service seminars for teachers.

The materials used are either imported or loaned from foreign agencies or embassies. The Curriculum Development Centre of the Ministry of Education has realized this problem and photographic unit has been set up to produce filmstrips and slides in the first instance.

Preparation of microscope slides for biology

The study of microscope slides is an essential part of every biology student's education. Unfortunately, the majority of the slides now in use in schools are imported and therefore involve foreign exchange. Further, the specimens used are alien to students. It is proposed to set up a unit to produce microscope slides of local specimens. This unit will also train science teachers in the techniques of production of microscope slides.

Educational radio broadcast

The Ministry of Education, in collaboration with Sri Lanka Broadcasting Corporation, has launched a listening school project. At present there are about 1500 schools equipped with radio sets. School broadcast based on regular timetables covers four hours a day, and out-of-school broadcast two hours a day. These broadcasts cover subjects taught at junior and senior secondary levels, which include Integrated Science, Mathematics, Social Studies, Sinhala language, English language, Tamil language and Ethics.

THAILAND

The Ministry of Education of Thailand approved the new National Education Plan since 1975. Under this plan, not only the 6-3-3 system has been adopted, but also there is a great change in the school curriculum. The Curriculum Development Centre views the new curriculum as a more integrative type with genuine emphasis on child-centred teaching-learning activities and hence calling for a tremendous effort in the design, development, utilization and disseminatation of instructional materials and related

matters. An efficient re-organization of the existing systems for the dissemination and distribution of the materials must be undertaken by responsible agencies. Since Thailand is a developing country, low-cost instructional materials should be of central issue for consideration.

Need for low-cost educational materials

One of the major problems of education in Thailand is how to keep up with the demand of quality education brought about by the rapid school population growth and disparity of educational materials between the urban and the rural schools. To cope with this demand, the search for curriculum innovation and appropriate educational technology including the development and production of low-cost eductional materials is imperative.

Types of materials being developed and used

In Thailand, other agencies aside from teachers have developed and produced low-cost educational materials. These include, among others, two-dimensional graphs, charts, maps, posters and picture sets as well as three-dimensional ones like models, specimens, puppets, dioramas and simple science kits.

Education/training for instructional aids production

Teachers generally utilize local resources to develop their teaching materials. On the other hand, the Ministry of Education, teachers colleges and universities frequently conduct in-service training programmes where most elementary and secondary teachers learn to develope simple educational materials using local or available raw resources. As for the on-the-job teachers, they undergo training whenever the responsible agencies organize work for this purpose in accordance with the operation plan of those agencies.

Mechanism for development, distribution and evaluation of materials

At the moment there are agencies responsible for facilitating the production of various kinds of prototype materials for dissemination. These agencies are the Curriculum Development Centre (CDC), the Centre for Educational Technology, the Institute for the Promotion of Teaching Science and Technology, the Educational Material Centre, the Teachers' Council Materials Production Agency as well as the regional education offices.

Problems and constraints

Some of the problems in the development of low-cost educational materials are the limited budget of the Ministry of Education, the indifference of some teachers towards locally produced materials as well as the lack of know-how. Also, the expertise of other agencies have not been adequately involved or utilized in the development programme.

Future plans

There are plans for strengthening the development programme for low-cost educational materials through the Curriculum Development Centre, the Department of Educational Techniques, Ministry of Education, the Institute for Promotion of Teaching Science and Technology, the nine universities and 36 colleges responsible for training teachers. The Ministry of Education also plans to hold more in-service training seminars for elementary and secondary school teachers throughout the country in order to develop attitudes and to provide them with the necessary skills and competencies for the development and production of low-cost eductional materials.

Design, development and production of educational equipment in Thailand

Generally, the design, development and production of educational equipment are carried out by both professional personnel in the specialized fields as well as by teachers. The standard equipment and instructional aids are undertaken by specialists or technicians whereas low-cost ones are made by teachers. With regard to instructional aids, both groups will critically study the aims, principle, structure and objectives of the syllabus first, then examine the concept/content, teaching-learning activities and evaluation process. The result of this investigation will help the specialists/technicians and teachers to know about what the instructional aids would be appropriate for, what instructional methodology could be used, and what possible outcomes would be expected. Then production of the instructional aids is made for either individual use or on a large-scale basis, depending on those responsible, who normally are teachers and designated departments responsible for school administration with regard to production by teachers. In many cases students are also active in the production process. Parents are also invited to help the teachers when considered necessary and appropriate.

CHAPTER III

BACKGROUND AND GENERAL DESCRIPTION OF THE INSTITUTIONS/PROGRAMMES/ PROJECTS/ACTIVITIES VISITED

IN THE PHILIPPINES

The study visits started with a briefing session in the Bureau of Elementary Education where the participants were introduced to the Philippine educational system.

The participants had the opportunity to visit the following:

Bureau of Elementary Education Resource Centre

In this Centre, books, brochures, masteral theses, pamphlets, magazines and other print media are found. This Centre was set up for the use of the Bureau of Elementary Education personnel. Teachers from the field who may want to avail of some data needed in their studies come to the Centre. This Centre is managed by the Staff Development Division of the Bureau.

Learning Centre on Wheels

This is also known as School on Wheel, Centre on Wheel or a Mobile Learning Centre. This is a non-formal approach to democratize access to educational opportunities among the urban poor. This Learning Centre aims to:

- democratize access to educational opportunities among deprived pre-school children;
- develop the intellectual, spritual, aesthetic and social values of deprived pre-school children; and
- narrow the gap between the haves' and the 'have-nots' among pre-school children.

This Learning Centre is set up in a van which goes to depressed, heavily populated places in the urban areas to deliver learning opportunities to pre-school children. This van is equipped with educational materials which children can make use of in their manipulative and creative expressions. The pre-school children are also given opportunities to socialize through the use of a tape recorder which is one of the accessories of the Learning Centre.

Educational Media Centre

This is one of the places visited in the Division of City Schools, Manila. This Centre aims to:

- hold seminars and workshops on the role of school media centres;
- teach media teachers to produce low-cost media materials from local and available resources;
- train teachers on the preparation and use of combination media relevant to the curriculum; and
- design and construct prototype educational materials that could be used in schools.

This Centre has the following components: an auditorium, a print library, a conference and a viewing room, a production area, a photography room and a dark room. This Centre was organized to provide media services to eighty (80) elementary schools and twenty-seven (27) high schools. An integrated production and in-service education programme has been designed to maximize training of teachers in the development of low-cost educational materials.

Decentralized Learning Resource Centres

These Learning Centres are strategically located to cater to the needs of the teachers in the Division of City Schools, Manila. One of the Centres is found in a Quezon Elementary School which attends to the media needs of the schools in the southern part of Manila, while the other Decentralized Learning Centre is housed in a Bonifacio Elementary School which caters to and service the media needs of the schools in the northern part of Manila.

Prototype low-cost educational materials, print media and a variety of instructional materials are found in these Decentralized Learning Centres. Teachers can come to these Centres to borrow some of the prototype teaching materials which would be most appropriate for their teaching needs to make teaching-learning results effective.

Low-cost Science Instrumentation Project

This is one of the projects visited in the Division of City Schools, Manila. This project aims to:

- produce low-cost science equipment and devices for the use of the schools; and

- make the schools self-sufficient in science equipment.

The aforementioned project is being undertaken by the Secondary Science Department of the Division of City Schools, Manila. It has established co-operative linkages with the Vocational Arts Department and with the Educational Media Centre of the Division.

The project activities consist of the planning and formulation of projects which is done by the Science Department and the production of these projects is handled by the Vocational Department which sees to it that all produced materials conform with the specifications set.

Philippine International Convention Centre (PICC)

This is a very imposing structure designed by one of the noted architects in the Philippines. The plenary session hall of this Centre has a seating capacity of four thousand. International as well as national conventions, conferences, seminars and the like are held in this Centre. The participants had a chance of viewing on the Multi-Vision Theatre, composed of fifteen screens, the various stages of Philippine history from the Spanish era to the present era of the new society.

Design Centre, Philippines

This Centre was created with the signing of Presidential Decree 279 on August 24, 1973. It aims to:

- promote, enhance and develop the design of Philippine-made products;
- develop new products through imaginative use of local and indigenous materials;
- optimize the functions and aesthetic potentials of indigenous materials; and
- consider the market factors in the products total design.

It implements two main programmes, that of design development and design promotion. To implement its design development programme, the Design Centre created working groups to handle product design, prototyping and experimentation and to provide direct design and consultation services to the public. A design workshop was established, staffed and equipped to provide the design teams with a viable laboratory for working on their designs. This work-

shop has specialized areas for tapestry and weaving, bamboo and basketry, rattan-craft, paper-making, ceramics and pottery, jewelry, metalcraft, woodworking and shellcraft. A variety of prototypes has been evolved from the different design teams. This Centre started tackling its design promotion programme with four sets of complimentary activities, educational exhibits, audio-visual and film production, documentation and information activities.

U.P. Science Education Centre

This Centre is in charge of the production of try-out copies of textbooks in science and mathematics which are geared for the average learners in the public schools in the Philippines. Materials for the textbooks are field tested, evaluated and revised in the light of feedback from experimental classes. These textbooks are tested for at least a year in 10-35 schools. Pilipino scientists, mathematicians and science and mathematics educators work as a team in writing the textbooks.

Division seminar-workshops on the production of low-cost instructional materials in the Division of Angeles City in Region III and the Division of La Union in Region I

These seminar-workshops aim to:

- prepare support instructional materials in communication arts (Pilipino and English); and
- maximize utilization of indigenous/locally availble resources in the preparation of low-cost instructional materials to depict cultural heritage and capabilites in the division.

These seminar-workshops are premised on the exploration and utilization of local cultures and practices and of indigenous materials for generating solutions to local economic and educational problems in the Philippines.

Extensive use of low-cost educational materials are noted in all of the schools visited in the Philippines.

Comments and suggestions

All the participants appreciated the programme of development of low-cost instructional materials in the Philippines. Use of indigenous/waste materials, development of the materials by the teachers themselves and appropriate planning for spreading the

programme to all elementary schools are points worthy of attention. It is also felt that the programme would not only make the elementary teacher more self-reliant, but also involve her more with the process of teaching-learning. As the programme involves the grass-root workers, it stands a good chance of success.

It is suggested that during the training programme more time be devoted to planing -- why and what -- of learning materials. Packages for a topic/unit should be designed. Learning materials developed should be evaluated for comprehensibility and functionlity. The teachers should also understand the difference between tools and aids. She should also be encouraged to continuously test the materials at her own level and modify them appropriately. Lastly, the impact of the programme should be studied and the findings made available to the country.

The programme is more appropriate for the lower grades in the elementary school. It needs to be supported by development of appropriate materials for older children. Local print materials, audio-tapes and projected aids may be planned as support materials for upper grades. For this purpose, Media Centres should be strengthened. For motivation and variety, competitions and exhibition of the materials developed should be organized.

Several participants felt that a motorized vehicle as a mobile learning centre was not a practical idea for rural areas, but that it was serving a useful purpose in developing non-formal and continuing education in urban areas.

Some participants also requested that detailed information, giving details of programmes such as those seen in the Philippines, may be made available through APEID to those countries that wish to organize similar programmes.

IN THAILAND

1.Curriculum Development Centre (CDC)

Organization of the Curriculum Development Centre

The CDC is an integrate part of the Department of Educational Techniques, one of the nine departments in the Ministry of Education. The Department of Educational Techniques has overall responsibility for maintaining and improving the quality of education in all formal institutions below university level. It is thus responsible for curriculum development, research, evaluation, guidance and materials. Basically, the CDC can be seen as the heart of the Department, with all other Centres and Divisions in the De partment supporting and strengthening the curriculum development and implementation activities.

At present, the CDC itself is divided into six sections, namely, the Elementary Curriculum Development Section; the Secondary Curriculum Development Section; the Special Curriculum Section; the Regional Curriculum Development, Evaluation and Training Section; the Administration and Coordination Section and the Instructional Aids and Curriculum Innovation Development Unit.

Basic characteristics of the new curriculum

At both the elementary and secondary levels, there are certain common characteristics with the new curricula. For example, the new curricula are designed to be more relevant and functional, with much more integration and less concentration on esoteric subject matter; the curriculum at each level (primary, lower secondary and upper secondary) is designed to be complete in itself and terminal; English is no longer a compulsory subject; and those who teach are being made increasingly responsible for evaluation (with much less emphasis on external evaluation).

2. INNOTECH Project RIT (Reduced Institutional Time)

Project RIT is an experimental project of the Regional Centre for Educational Innovation and Technology (INNOTECH) which is a regional centre of the Southeast Asian Ministers of Education Organization (SEAMEO), the members of which are Indonesia, Democratic Kampuchea, Laos, Malaysia, the Philippines, Singapore, Thailand and Republic Viet Nam.

Project RIT started its operation in Thailand on 1 July 1977. The Department of General Education, Ministry of Education, has been delegated by the Thai Government to run the project under

the supervision of INNOTECH. It is partly financed by the United States Government through the Agency for International Development (AID). Its office is located at Muang Mai School, Lopburi. The experiment covers primary schools in 5 provinces: Lopburi, Singburi, Saraburi, Chaiyaphum and Nakorn Rajsima.

Project RIT is the only project of INNOTECH that is carried on in only one country, Thailand.

The Project's goal is to develop learning packages in which teachers'instructional time is reduced while pupils' level of achievement is maintained.

3. The Unit of educational research and teaching development

Thai Language Department, Faculty of Humanities and Social Science, Petchaburi Teachers College.

"FIT" is the acronym of the whole programme of this unit. It stands for Free, Fair, or Folk (F) Innovation (I) for Teaching (T).

Main objectives

1. Undertaking educational research and developing techniques in teaching;
2. Providing instruments and useful information for dissemination to the schools and colleges;
3. Training the teachers to be able to produce and use the instruments, including making their own lessons for successful teaching; and
4. Providing advice and information service for effective teaching.

Teaching aids and teaching machines in "FIT" programme

1. Magic board
2. Moving cards
3. Box library
4. Coconut slide viewer
5. Can teaching machine
6. Reading card teaching machine
7. Tanou teaching machines:

- For presenting the lessons, including the questions and answers;
- For giving the rhythm;
- For playing the musical sounds;
- For testing and measurement; and
- For testing some substance in water.

8. Tanou independent amplifier
9. Listening centre
10. Low price earphones
11. Broadcasting master console
12. Voice proving technique

4. Science Museum

Realizing the importance of science, the Ministry of Education of Thailand established the Science Museum in Bangkok as a central source of information on science and technology. The museum is to serve people and students from all levels, helping them to understand science and its applications through simple exhibits, demonstration lectures, as well as films, television and slide programmes. About 60-70 per cent of the exhibits are permanent and reveal basic scientific ideas and concepts. The rest are temporary exhibits and activities which are changed every two months. Special programmes will be arranged for school groups as required. The Museum is also a place for recreation as well as study.

Location

The Science Museum is located close to the Ekamai Bus Terminal. It is in the same area as the Bangkok Planetarium, Thailand's astronomy centre.

Objectives

1. To spread knowledge of science and technology for the benefit of students and people of all ages;
2. To supplement the science education provided in schools and colleges;
3. To act as a catalyst for science teaching and equipment for science learning;
4. To demonstrate the application of science and technology in industry and daily life;

5. To collect products which portray the growth of science and technology; and
6. To provide people a place for study as well as recreation.

Exhibits

1. Basic concepts in science:
   - Mathematics
   - Tools and measurement
   - Simple machines
   - Magnets and electricity
   - Energy conversion
   - Waves
   - Atoms and substances
   - Life and ourselves
   - Life science: evolution, genetics, ecology etc.
2. Technology:
   - Man and his necessities
   - Population
   - Transportation
   - Technology in agriculture
3. Teaching units:
   - Auditorium presenting films, demonstrations and seminars
   - Discovery room containing direct touch activities of science process
4. Outdoor exhibits:
   - Appropriate technology: wind mill, hydraulic ram, bicycle wheel pump, solar energy and primitive technology.

5. The Institute for the Promotion of Teaching Science and Technology (IPST)

The Institute for the Promotion of Teaching Science and Technology was established through co-operative action of the Royal Thai Government and the United Nations Education, Scientific and Cultural Organization (UNESCO). It was granted official status on 16 January 1972 as a semi-autonomous body within the Ministry of

Education, having a board as its policy maker. The Institute's Governing Board is composed of a Chairman, the Under-Secretary of State for Education, five ex-officio members, six appointed members and a secretary.

The objectives of IPST

1. Improvement of modern science and mathematics curricula;
2. Promotion of new trends in teaching and learning science and mathematics in Thailand; and
3. Development of mutually beneficial relationships among the institutes, schools, teacher training institutes, universities and the Ministry of Education that will permit the IPST to draw upon their expertise and experience to improve the curricula.

What is IPST doing ?

1. Production of curricula textbooks and teachers manuals;
2. In-service teacher training for the implementation of IPST curricula;
3. Training of in-service teachers in elementary mathematics;
4. Pre-service training;
5. Fellowship programmes; and
6. Research.

Comments and suggestions

The participants who left with an impression of comprehensive planning and efficient execution of the schemes in most institutions and programmes visited. Deep involvement and sound perceptions of the person working on the various projects were noticed with appreciation. In most cases, the departments had the responsibility for all the steps involved, namely, planning, designing, prototypes, testing, production, distribution and the necessary extension training programmes for teachers. It is felt to be a very sound practice which would keep all concerned on the ground IPST and CDC are two examples.

Greater self-reliance in the production of materials, e.g., those for non-formal education and teaching-learning aids being produced and promoted at FIT and the experimental learning packages of RIT help in producing materials which are more relevant for the learners.

Use of Thai at all levels of education was also noted with appreciation.

The practice of disassociating learning in schools from grades in the public examinations, so common in some countries in Asia, was also taken note of.

Since schools are closed for the vacation, classroom teaching-learning could not be observed. This left some gap in getting close to a complete picture.

Either due to lack of time or restricted range of programme of low-cost instructional materials, efforts in utilization of mass media like radio and television were not shared. It is felt that though not designed and produced at the local level, these may not be considered as expensive materials. Countries can benefit from each other's efforts made in this area.

Countries planning to revitalize their set-ups for curriculum designing, etc., may like to study the set-up in Thailand in detail by attachments.

IN NEPAL

The National Education System Plan was introduced in Nepal in 1971 with national development activities. The NESP which has been implemented in its totality throughout the country is a multi-dimensional plan with multifarious objectives. The following have been the guiding principles of the Plan:

1. Universalization of education;
2. Democratization of the education system;
3. Linking education with national development programmes; and
4. Emphasis on vocational and technical education.

Though some of the objectives of NESP have yet to be achieved, the country has been successful in increasing the numerical targets and the universalization policy. To-day 23,395 primary school teachers are teaching 769,049 primary students in 9,067 primary schools. There are 2,400 lower secondary schools where 226,693 students are enrolled The number of secondary school has reached 552 and 3,665 teachers are teaching 82,158 secondary school children. The enrolment of students is also rapidly rising in the institutes of higher learning.

The Sixth Five-Year Plan envisages to enrol 85 per cen of school-age children at the end of the Plan. Free distribution of textbooks, providing better teachers and flexible scheduling in primary schools might be required. As the problem of non-enrolment of girls has also affected the universalization of primary education, efforts should be made to produce large numbers of female primary teachers. For the qualitative improvement of primary education, upgrading the quality of teachers and improving the quality of supervision would be required.

Although the NESP requires every primary teacher to receive one year teacher training after School Leaving Certificate, the majority of teachers in the remote and semi-remote districts are still underqualified or are untrained teachers.

The major problem in lower secondary education is the shortage of qualified teachers. More than 50 per cent of the teachers in this level are underqualified. Vocationalization of secondary school education has been a major thrust of the NESP and all the secondary schools have started to teach vocational subjects.

In line with the growing realization of the usefulness of educational materials for the purpose of making the teaching-learn-

ing process in the classroom effective, Unesco/ACEID has organized study visit programmes in educational technology in different countries and the Centre for Educational Research, Innovation and Development (CERID) had hosted one such programme.

The Centre was established in 1976. The main objectives of the Centre are to undertake projects on educational activities aimed at finding alternative solutions; identify problems and develop, test and suggest measures that could help educators, administrators and educational planners in improving the patterns of educational activities as well as in taking decision policies and steps for educational development in Nepal. Formerly CERID was under the National Education Committee, Ministry of Education, but later it was handed over to the University as a part of its education research centre.

Buddhanil Kantha Secondary School

This is a boarding school situated about 10 km north of Kathmandu. It was established in 1972 jointly by His Majesty's Government of Nepal and the British Government. The classes run from grades IV to X.

Curriculum, Textbook and Supervision Development Centre, Harihar Bhawan (CTSDC)

The Centre is an integral part of the Ministry of Education. Formerly it was a small unit concerned with only curriculum. Now its function has broadened and more responsibility has been given to it to develop and improve the quality of education up to the secondary level. The Centre is responsible for curriculum development, research evaluation, supervision and guidance in the field of education.

The Centre has a separate writers division for different subjects so that they may be able to produce the best book based on the curriculum. It has a separate audio-visual section for radio educational programmes for teachers and students. At this time the CTSDC is working on an integrated primary curriculum, the objective of which is to reduce the curriculum and the number of textbooks so that free distribution of textbooks in the primary level could be simpler, easier and cheaper. Experiments in two districts have been carried out. The course contents have some similarity and the principal subjects are familiar to the child's environment too.

Mahendra Ratna Campus, T.T.C.

After the implementation of NESP, the campus is totally engaged in the production of trained teachers for the primary and lower secondary school levels. In-service and pre-service training are conducted with a greater emphasis on the textbooks and syllabuses of the primary and lower secondary levels.

Research Centre for Applied Science and Technology (RECAST)

The Centre is engaged in the field of research in science and technology. It places emphasis on the production of objects using low-cost materials. The Centre has produced a lot of things but these are yet to be produced on a large scale. Researchers and degree-level students can come to do their research in the Centre too. Certain provisions or facilities are made so that the more energetic and active researchers can utilize the Centre for the benefit of their research work.

The Centre is six years old and has sophisticated apparatus. The aims and objectives of RECAST are as follows:

1. To undertake research activities in the areas of science and technology, and to identify useful research findings for socio-economic development;
2. To generate local capability for the development and application of science and technology;
3. To develop conditions and environments for the exchange of knowledge and information among scientists and technologists for problem identification in the country's development;
4. To co-operate with educational and training institutes for the production of low and middle-level technicians needed for the successful implementation of the country's plans; and
5. To collect detailed information on the country's resources, to conduct necessary research for the utilization of these resources, and to offer suggestions and advice to the industrial sector on the use of the research findings.

Kanya Secondary School

This girls school was established in 1945. There are 1,500 students and 40 teachers. The school has three vocational subjects, namely, Knitting, Sewing and Food Technology.

Mahendra Bhawan Girls Secondary School

This residential school was established as a mission school in 1954. The school has 700 students with 27 teaching staff. Food Technology, Knitting, Sewing and Cutting are the vocational subjects taught in the school.

Laboratory School

This is a residential vocational secondary school established in 1953. It has a separate section for blind students. Home Science, Accounts and Secretarial Science are the vocational subjects taught in the school. Bamboo and cane works are for the blind students.

Sanjibani Vocational Model Secondary School

The school was established in 1949. Horticulture, Home Science and Secretarial Science are the vocational subjects. There are 581 students with 17 teachers. The local people have taken a keen interest in the overall development and physical facilities of the school. The people's participation for the betterment of the school is very effective.

Radio Educational Teacher Training Project

The main objective of the project is to develop and test a training programme for the untrained rural primary school teacher through the media of radio.

It has two phases. The first phase will be devoted to procuring and installing equipment, designing and building facilities, developing and refining management structure and preparing competent personnel in management.

The second phase will be devoted to conducting and evaluating a year-long programme involving pilot groups of 100 to 150 teachers. It has a target of 1000 teachers to train. In the third year the target would be 2,500 teachers.

The Ministry of Education will prepare the basic curriculum materials for the projects. CTSDC will record the scripts and Radio Nepal will broadcast the recording at different times. Field supervisors will also be trained for that purpose.

Radio Education Programme, Audio-Visual Section

With the assistance of UNICEF, the Section started the Radio Education Programme from 1971/72. Social Science, English and Nepali are taught over different frequencies of Radio Nepal. Radio sets are distributed in 17 districts as the first and second phases of the programme. Evaluation forms to test and measure the success

of the programme have been prepared.

Janak Educational Materials Centre

For the fulfilment of the educational materials required in the NESP period, the Centre was established under the Ministry of Education, but later it developed into a company with a 50 per cent share by the Ministry.

Its main aim is to produce and develop textbooks, teachers' guides, science materials, educational maps, charts, films, etc. Since the Centre is not profit-oriented but is to provide service, its materials are sold at a cheap rate.

The Science Equipment Division has designed and produced science and vocational equipment for the improvement of teaching science and vocational subjects in Nepal since 1972. Its aim is to use local raw materials in producing the equipment.

Comments and suggestions

Involvement of the University with the Curriculum Development Centre in the preparation of various curricula and for the development of low-cost instructional materials is bound to produce good results. In most countries the universities do not get involved sufficiently with curriculum development of schools. Another focusing point in its activities is the adult education project and non-formal education.

Development of integrated primary curriculum in the CTSDC is noted. It has developed an integrated primary textbook that was experimented in two districts in grade I. After evaluation this textbook and the curriculum will be implemented in other parts of the country. The Centre is also in the process of developing textbooks for grade II and grade III simultaneously. It has also developed some inexpensive, simple and effective equipment for science teaching.

It was noted that the TTC is training teachers so that they can manage multiple classes in rural schools.

RECAST is developing local resources. The study team felt that the project for developing ceramics and porcelain objects for school laboratories is commendable.

The study group noted one example of community involvement in practical support of setting up school facilities, such as a science centre.

The study group commends the approach of the Radio Teacher Training Project in training experienced Nepalese educators to carry out the task. Training through this approach, if successfully implemented, will be of great help to untrained teachers in the country.

The services of the Audio-visual Unit may be utilized in developing and designing low-cost teaching materials like posters, flip-charts, flash cards, picture books, educational games and educational models, apart from costly media like films, filmstrips, audio tapes and slides.

It is suggested that educational broadcasts might be supported by the production and distribution of manuals and guides.

IN INDIA

The participants visited the National Council of Educational Research and Training (NCERT) on 29 October and 3 November 1979. The NCERT is an autonomous body fully financed by the Government and functions as the academic adviser to the Ministry of Education and Social Welfare, New Delhi.

With a view to improving the quality of school education in India, NCERT:

- undertakes, aids, promotes and coordinates research in all branches of education;
- organizes pre-service and in-service training mainly at an advanced level;
- organizes extension services;
- undertakes and organizes studies, investigations and surveys relating to educational matters or the appraisement of educational programmes; and
- disseminates improved techniques and practices; and acts as a clearing house for ideas and information on all matters relating to school education.

The participants saw the work of one constituent unit of the NCERT, namely, the Centre of Educational Technology, and two departments of the National Institute of Education, namely, the Department of Education in Science and Mathematics and the Department of Teaching Aids. They were also given the opportunity to know about a special project - Comprehensive Access to Primary Education in the area of non-formal education.

The Department of Education in Science and Mathematics

The Department of Education in Science and Mathematics (DESM) is one of the departments of NIE. It is responsible for designing of curriculum and development of textbooks, implementation and evaluation of curriculum, and research in science education at school level. It also prepares teachers' guides, manuals for all levels of school teachers, and workbooks for students. Certain new innovations in curriculum development, like environment studies for classes I and II and integrated science for the middle school, deserve special mention. Linking of science with daily life of the children and integration of science concepts with the environment in these courses denotes a significant departure from the conventional science courses. Apart from all such

activities, it has undertaken a research project that is known as secondary science project. A team of experts were drawn from different branches of science and mathematics out of existing potentialities of the Department, and experienced teachers from Kendriya Vidyalaya were also involved. The main objective of this project is to find out how learning of science at the secondary level can be modified without involving costly equipment and apparatus or modern science laboratory. It would not be out of place to mention that most of the schools in India, particularly the rural ones, have no laboratory facilities. From the report on the secondary science project, it is understood that much of science can be learnt and taught without involving costly apparatus. Science can be learnt from direct experience in daily life and with the help of available resources in the school and home environment. Worksheets for students were designed in such a way that these could be used as a part of activity in classroom or as homework. The question and answers are based on real experience leading to a better understanding of the science concepts dealt with in the textbook. These materials were tried out in a school with good results and then it was extended to seven more schools and also received good responses. The worksheets were modified according to suggestions offered by participating teachers in a workshop for trying out in a large number of schools. On the basis of the results, the final form will be made availble to all other schools.

This Department has prepared science kits on biology, physics and chemistry for the primary level as well as a good number of films in collaboration with the Department of Teaching Aids.

Department of Teaching Aids

The Audio-visual Section of the Ministry of Education led to the establishment of the National Institute of Audio-Visual Education in 1959. In 1961 it became a part of the newly formed NCERT.

With facilities for film making, photography, offset printing, silk-screen printing, workshop, seminar room (16 mm film and slide projection), auditorium (16 mm & 35 mm projection), sound studio and a central film library (8,000 films and filmstrips), the Department has been conducting training courses and carrying out production of audio-visual aids.

The earlier programmes of the Department consisted of offering courses in audio-visual methods, graphics, projected aids and technical operation and maintenance of equipment to teachers

and teacher educators of the country as well as to teachers from Asian and African countries through bilateral exchange of Unesco programmes. While the technical and graphic courses are being continued, the Department has shifted its focus towards the production, management and utilization of low-and medium-cost AV aids.

The Department has so far produced 16 instructional films in English and Hindi on topics related to NCERT-devised curricula and science kits. These have been made in collaboration with the Departments of NCERT and its four Regional Colleges of Education. In recent years attempts have been made to evolve multi-media packages (slides, flash cards, audiotape and handbook) through short-term workshops. Such production of materials are related to: Science, Social Science, Environment, Low-cost aids, Non-formal (Adult) Education, Population Education, Culture, etc.

The work on educational technology of low-cost teaching aids is now two years old, during which five workshops in rural areas of the country have been held with the participation of rural teachers and artisans. The various ideas and concepts developed in the form of models and charts have been refined and an instructional manual is under preparation. The basic idea in spreading the low-cost aids is to create a dynamic process whereby the teachers, students and community can prepare the learning materials from their own resources and technology. A system design has been evolved where innovations coming from grass-roots levels can be disseminated to wider cross-sections of the teachers in the country. Several reports, posters and more than three dozen models and charts have been developed by the Department with the rural teachers and subject experts of the Science Department of NCERT.

In addition, the Department provides service facilities for the planning and production of slides, filmstrips, posters, diagrams, charts for other departments of NCERT and the Government of India.

Centre for Educational Technology

The Centre for Educational Technology (CET) was set up by NCERT, with a special grant from the Ministry of Education, in 1973. The UNDP and Unesco have also assisted in the growth and development of the Centre.

The major functions of the CET are:

- To design systems of rational redistribution of manpower and material resources for maximizing educational gains and reducing cost and wastage in education;

- To promote utilization of various media for increasing efficiency of educational communication in both formal and non-formal situations;
- To design and promote systems for life-long education; and
- To help in making educational opportunities available to the disadvantaged sections of the society.

In the Centre for Educational Technology, two special projects were explained to the participants;

(a) In-service Training of Teachers Through a Multi-media Package

In the year 1975-76 when the Satellite Instructional Television Experiment was in operation, the Centre for Educational Technology organized training for 46,000 primary school teachers in teaching science with the help of a multi-media package. The package comprises learning materials through radio and television as well as self-instructional materials in print and practical work to be undertaken by the trainees at the centres where training programmes were organized. This was an exercise in the management of a programme for several thousand teachers scattered over thousands of kilometres as well as an experiment with the utilization of newer mass media like radio and television. One of the noteworthy elements in the experiment was the use of radio-vision. Several studies pointed out the success of the programme.

(b) Language Learning Project

This is an experimental project being implemented currently in 500 schools of the State of Rajasthan in northern India. The project aims at enhanced efficiency in learning the first language. It has started with children studying in class I of primary schools in remote rural areas in the State. The curricula and learning materials, including a daily broadcast of 15 minutes, are designed and produced by the Centre for Educational Technology. Specimens of materials and techniques are pretested before adoption.

The project is being implemented in collaboration with Akashvani (All India Radio) and the State Department of Education, with UNICEF providing the radio sets. Educationists, language experts, producers and researchers work together in the production and testing of the materials.

The teachers concerned were given a two-week training in the understanding and proper utilization of materials before the academic year started. On-going monitoring and supervision point towards successful implementation. However, a partial evaluation will be

available only in the first half of 1980. The project will be extended to class II in 1980 and to class III in 1981.

On 30 October, the team visited four schools in the rural areas of the district of Jaipur where this project is being implemented and saw the utilization of various materials like flash cards, books for reading and writing in the classroom. Children listening to the broadcast of the day were also observed.

Comprehensive Access to Primary Education (CAPE)

This project of NCERT aims to develop, implement, evaluate and instructionalize a non-formal educational system in the country for the benefit of those children of age group 9 to 12 who:

- have never attended a school;
- were early dropouts from elementary school; and
- had finished elementary school but did not proceed further.

The main thrust of the project is to formulate decentralized curricula on the principles of relevance, flexibility and local specificity suited to the needs of the child and the community in which he lives. In the project, such learning centres are being developed where organized and systematic educational activities can be carried out outside the framework of the formal school system. The curricula are based on learning episodes obtained from the community. The episodes are further elaborated as learning experiences, keeping in view specific, desirable behavioural outcomes.

In the States which have shown willingness to implement the project, necessary trained manpower and infrastructure are being developed through orientation programmes for Directors of State Councils of Educational Research and Training, Principals of State Institutes of Education and lower level educational administrators. Simultaneously, the training courses for development of relevance based on local self-learning materials are being organized for teacher trainers. The student teachers are being trained to develop and test learning episodes as part of their course assignment.

By involving student teachers, it would be possible to collect hundreds of relevant episodes which can be used and elaborated not only by the communities from where these have been picked up but also by others whose problems are similar. Each community would develop some of its own materials and utilize those from other communities which seem relevant for its purpose.

The NCERT team has produced self-learning training packages for teacher educators and other workers concerned with the non-formal education of children of age-group 9 to 12. It also has the responsibility of monitoring and supervising the project which is assisted by UNICEF.

State Institute of Education, Ahmedabad

The State Institute of Education (SIE), Ahmedabad (visited on 31 October 1979) is the Academic Wing of the Directorate of Education of Gujarat State. SIE has several different sections to help the Directorate to plan and evaluate various programmes for school improvement. It works through the following sections:

- Extension and training;
- Research and evaluation;
- Audio-visual education;
- Non-formal education;
- Educational technology; and
- Publications.

In different sections, several specific projects are undertaken for experimentation. The participants were specially familiarized with the work of SIE in the area of non-formal education and utilization of mass media in formal school education. In non-formal education, SIE is implementing two programmes: (a) Primary education curriculum renewal which is directed towards making educational curriculum specific, relevant and flexible for the rural students. Special curricula and instructional materials are prepared, keeping the needs of the student's community in mind; and (b) Developmental activities in community education and participation. The specific objective of this project is to develop and test new types of educational activities as feasible means of meeting the minimum educational needs of groups which have been deprived of education. SIE is also implementing Project CAPE.

The collaboration of SIE with the broadcasting agency (Akashvani) of the State was explained to the team. Akashvani now depends a great deal on the competence of SIE for educational broadcasts. A special project of broadcasts for teaching English along with the training of teachers has been undertaken by SIE, Ahmedabad.

Several teaching-learning aids produced during training programmes organized by SIE were available for viewing.

National Institute of Design

On 31 October 1979 the team visited the National Institute of Design. This Institute was set up in 1961 by the Government of India as an autonomous national institution for education, research, service and training in industrial design and visual communication.

The educational tasks at the Institute include:

- Educating students in several design disciplines;
- Continuing the education of professional designers;
- Experiments and development projects in design;
- Design consultancy services; and
- Propagation of design consciousness in the country.

Projects and classroom experiments are utilized to stress the inter-disciplinary nature of design activity.

The work of the Institute extends far beyond industrial design; it trains graphic artists who help with communications at all levels of education. The Institute also works, at times, in collaboration with educational institutions such as NCERT and the Centre for Educational Technology in the development and production of learning materials. One example that participants saw was the preparation of a book for an introduction course for students of art at the plus-two stage of higher secondary education. This is a collaborative effort between NCERT and the Institute.

The team saw several products, including print materials for young learners, as well as the facilities of the Institute.

Space Application Centre

The participants visited the Space Application Centre (SAC) of the Indian Space Research Organization (ISRO) on 1 and 2 November 1979 for two half-days. They were familiarized with the programmes of SAC in the area of television broadcasting and reception via satellite. The major programme discussed at the Space Application Centre was the Satellite Instructional Television Experiment (SITE) which was conducted between 1 August 1975 and 31 July 1976 as a collaborative programme of India and U.S.A. using the Geostationary Satellite ATS-6 and the group systems built by ISRO. Under this programme, 2,400 villages spread over different parts of India regularly received four hours of instructional TV programmes

every day. The TV programmes were transmitted to the satellite from the earth-stations at Ahmedabad and Delhi and were received in the villages through a Direct Reception System specially designed for this project. The programmes were in the field of school education, agriculture, health and family planning with emphasis on rural development. These programmes provided India with an opportunity to experiment with the use of television for rural development.

SITE is an example of close collaboration between various departments and ministries working for rural development. It was also an exercise in the planning and implimentation of all aspects of the use of a medium, including hardware, software production, pretesting, transmission and evaluation of the programmes.

The satellite was also utilized for imparting in-service training to the teachers and village-level workers for community development.

At the Space Application Centre, it was emphasized that continuous research and development work in evolving hardware which are most suitable to the needs of the country and are less expensive, is undertaken in the SAC. Another point emphasized in the development of software was a team approach between producers, researchers, subject specialists and psychologists or sociologists as the case may be. A spirit of continuous examination, correction and reattempt has helped in evolving programmes and strategies which are more meaningful for the country. Some examples of evolvement of participatory programmes from rural areas were shown to the participants. Two videotapes carrying different approaches to educational programmes for young children were also shown to the group.

Satellite Telecommunications Experiments Project (STEP) was also explained breifly. This project experimented with:

- Use of transportable terminal for remote area communication, TV transmission and programme transmission for radio networking;
- Use of small air-liftable and jeep transportable terminal for emergency communications;
- Digital communication with multiple access for carriage of trunk telephony;
- Integration of satellite circuits into the automatic trunk telephone network; and
- Transmission via satellite of multiple audio channels along with a single video channel.

STEP was a joint project of ISRO, Post and Telegraph and Symphonie - a French-German satellite.

Of other facilities seen, the low-cost studio and equipment developed was of special interest to the group.

Vikram A. Sarabhai Community Science Centre

A visit to the Community Science Centre was organized on 2 November 1979. 'Change through interaction' of scientists, teachers, educationists, students and interested people in the community forms the basic philosophy of the Centre. It has contributed a great deal in making science learning effective by providing appropriate opportunities and materials to the learners in its premises. The programme places emphasis on the student as the focal point and provides opportunities for the children to learn by themselves. Through its Open House of laboratories, playrooms, bulletin-boards displaying puzzles and workshops, it encourages curiosity and the spirit of enquiry among the children who visit the Centre. The Centre throws open its facilities to anyone who is interested in learning science at no cost to the learner. It also has a well-equipped library for students and teachers to refer to as the need arises.

In the Open House Activity Programme (OHAP), the children get involved in:

- Science experiments in various laboratories;
- Audio-visual experimentation;
- Science playroom activities;
- Use of library; and
- Playground and film shows.

A small but highly skilled staff at the Community Science Centre continuously experiments with evolving and testing of new materials. The new materials are frequently taken to the villages and tried out. Alternatively, the children playing with the new materials are watched by the researchers from one-way window with a view to providing feedback to the scientists regarding the effectiveness of the materials for learning as well as attention-holding efficiency.

The Centre is open to all students and teachers on Saturdays and Sundays. It is also open to this community during vacations. During weekdays, too, students from two schools can visit the Centre for carrying out experiments regarding their curriculum.

Educational Technology Cell, Jaipur

The team also visited the Educational Technology Cell (ET Cell), Jaipur.

Overall summary of visits

The participants are conscious of the fact that, given the time of four or five days, it was possible only to see a sample of the programmes/projects being implemented in each country. The geographical limitations added to the restriction of the sample of the activities visited by the group. Thirdly, in a short visit, the visitors are likely to be left with an incomplete understanding of all aspects of the projects visited. Within these limitations, an attempt to summarize what has been seen regarding the projects, the solutions to some of the problems, and the reactions of the group are recorded in the following paragraphs.

1. In all the countries visited, there is a felt need for change in curricula to be followed by change in learning materials and techniques to be employed. It was felt that while curricular changes are needed, they are difficult to effect owing to the relatively large number of teachers involved. The difficulty is aggravated in situations where the initial educational and professional qualifications of the teacher are also not adequate. In this connection, several attempts to impart in-service training to the teachers were seen in the countries visited. For example, at the Institute of Education, Tribhuvan University, Nepal, provision is available for teachers to upgrade their qualifications, and courses in specific subject areas are arranged on a regional basis for lower secondary and secondary school teachers.

In another approach, District Education Officers, with the help of subject specialists and supervisors, conduct short courses in the areas under their jurisdiction. National-level efforts include organization of workshops for the teachers to help them produce low-cost materials.

Another example seen was India's effort to reach a large number of primary school teachers using a multi-media package comprising telecasts, radio broadcasts, practical work and self-instructional materials.

It is felt that the use of training packages through correspondence courses supported by short-term contact programmes can be used in all countries for updating the teachers on new knowledge and practices. Also, there is a need for curriculum developers,

teacher trainers and administrators to work together to plan and execute in-service teacher training programmes. It is also suggested that the students in teacher training institutions may be oriented to new programmes being implemented in the country before they leave the training institutions.

2. To implement any curricular changes, new learning materials need to be developed. While the textbooks reflect the changed curricula quickly, the other materials, e.g., teaching aids, take a long time to be developed, tested and made available to the teachers. This problem has not been mentioned specifically in any of the centres visited, but from the information given by the institutions. It was fairly explicit that curricula are likely to get implemented much in advance of the availability of materials other than textbooks.

While some delay is bound to take place, it is felt that the the learning aids other than textbooks should be developed along with the textbooks. Also, haste in implementing the curricula without the availability of learning materials should be avoided.

3. Lack of coordination among agencies charged with the preparation of educational materials was noticed at several places. This leads to duplication and wastage of efforts.

Concentrating efforts in a larger organization, through its different wings, would be a step towards avoiding this wastage.

4. Teachers are being involved in some places in the development of learning materials other than textbooks. While this is a very welcome step, at times it becomes impractical for the teacher owing to lack of sufficient time. In some cases the teachers travel long distances or have to attend to their farms/gardens in their spare time and find it difficult to prepare their own materials.

It is felt that the establishment of widely spread resource centres which will loan materials to schools would be a step towards lessening the hardship of such teachers. Resource centre supervisors or other trained personnel could also visit the schools to assist these teachers to prepare their materials during working hours. The teachers may also be provided with handbooks giving detailed instructions for the preparation of aids from materials available in the vicinity. Since even low-cost learning materials need some funds for preparation, the schools/teachers may be given some reasonable grant for utilization for this purpose. Training programmes for the development of necessary skills in the use of various kinds of locally available materials may be provided from time to time.

5. In several cases teachers did not make use of materials even when they were available. This was due partly to limited space for organizing children into several groups. Apathy of the teachers in using instructional materials was also noticed.

While availability of more space/materials is an obvious solution for proper handling of large classes, involvement of teachers in the production of materials is likely to lessen their apathy. The example of the Philippines is relevant. Involving teachers also has the advantage of varied ideas in the production of prototypes. Use of low-cost materials would lessen the fear of loss due to breakage and consequent punishment.

6. The Science Museum in Thailand and the Community Science Centre in India provided opportunities through the use of simple and low-cost materials for the students and the teachers to gain an understanding of the principles of science through the discovery method. This non-formal system of education also provides an opportunity for transfer of learning experiences to their everyday life.

7. General lack of storage space in the institutions was noticed by the participants. This also discourages teachers from readily bringing in and using materials. A minimum amount of storage space should be provided in the schools.

CHAPTER IV

SUGGESTIONS FOR RE-ORIENTATION OF ONGOING NATIONAL PROJECTS AND ACTIVITIES

BANGLADESH

(1) In each of the four countries visited, there is a permanent organization responsible for the development of curricula and other related work, including the tryout of the curricula, the production of materials which facilitate curricula learning, evaluation system, the making of prototypes and the mass production of these materials. There is no permanent Curriculum Development Centre in Bangladesh working for the improvement of curricula, teachers' guides and instructional materials. Instead, these tasks are more or less done by various committees and organizations entrusted to them. For examples, textbooks and teachers' guides are produced by the Bangladesh Textbook Board and the Audio-Visual Centre produces some charts, filmstrips and films.

In this connection, it is strongly recommended to the Government of Bangladesh to establish a full fledged Curriculum Development Centre for the undertaking of the above tasks under a single compact authority.

(2) Like many other countries, the teacher training institutions of the country give training to the student teachers in the production of inexpensive educational materials; but when they actually take up teaching, they are not encouraged to make inexpensive materials for their schools. Mechanism to encourage and make these teachers think and produce such materials should be established.

(3) It is encouraging to note that the first workshop on the production of inexpensive teaching-learning materials will be held in the early part of January, 1980. Participation of Bangladesh in the current study visit will particularly help in enriching the workshop with ideas obtained.

(4) Bangladesh may also profitably consider the making of prototypes considered suitable for the country and distribute them to all schools at a very low cost, as is done in Thailand.

(5) Language teaching programmes through radio broadcast for the elementary classes as in India can be started in Bangladesh immediately on an experimental basis by distributing inexpensive radios to the schools. Non-formal education can also be started in a similar way.

INDIA

1. Active involvement of teachers, especially at the primary level, in the production of learning materials for their own use in the classroom should be strengthened. However, this activity may be guided by educationists at the planning stage.

   This activity would be recommended for areas rich in natural resources, e.g., the north-eastern and southern parts of the country.

2. Involvement of teachers' associations in development/production of materials would have an impact on utilization. Teachers' associations may also be involved in monitoring supervision of the programmes.

3. Distant learning systems -- radio and self-instructional materials -- may be deployed to a larger extent for training of teachers.

4. Organizations and persons concerned should plan for all aspects of a project/plan, e.g., production, testing, finalization, distribution, monitoring, feed-back and re-evaluation of the materials.

   A balance can thus be obtained between the ideal and the feasible.

5. Teachers' colleges should be involved more and more in in-service training of teachers.

6. For the development of prototypes, there should be some centres at district level, and mobile teams consisting of subject experts, media men and some local teachers may work together for designating the right kind of materials.

7. A list of common materials available in the environment may be prepareed, and a manual for developing teaching materials may be supplied to the centres.

8. Plastic industries may be encouraged to supply parts for developing low-cost teaching materials and distribution system may be developed.

INDONESIA

According to the suggestions and exchange of experiences during the study visit, it is felt that further systematic programmes should be undertaken in Indonesia to introduce and to promote educational technology to the teachers and the schools. The following steps are hereby presented for assisting and encouraging schools in the production and utilization of low-cost/appropriate educational materials:

1. National project for educational material development

The objectives of this project are:

(i) Developing educational materials, disseminating information on the production of low-cost materials;

(ii) Conducting seminars/workshops on low-cost educational materials for teachers, educational specialists and other personnel involved in the programme of low-cost educational materials;

(iii) Improving the organizational management for developing low-cost educational materials; and

(iv) Providing and publishing references and information for the teachers and other personnel on low-cost educational materials.

To achieve these objectives, the Project should conduct such activities as:

(i) Collection of data, information, samples and prototypes, and improvement of organizational framework;

(ii) Selection of some provinces and schools for pilot projects;

(iii) Recruitment of teachers, teacher educators and supervisors to support the project;

(iv) Operational action with involvement of teachers in seminars, workshops and other activities;

(v) Setting up provincial and regional centres of production of low-cost educational materials, supported by teacher training colleges, science teaching centres and universities.

2. Provincial/regional centres for the production and utilization of low-cost educational materials

These centres are especially concerned with the production and utilization of low-cost materials. The programmes must consist of several activities such as:

(i) Conduct of regional seminars/workshops on educational materials;

(ii) Training of teachers for producing low-cost educational materials;

(iii) Selection of samples and producing prototypes of teaching materials; and

(iv) Evaluation and supervision of schools on the utilization and production of low-cost educational materials.

3. Other activities and programmes to support the national project and the provincial centres

(i) The management of the project must be attached to the Directorate of Educational Facilities supported by the Curriculum Development Centre and the Centre of Technological Communication in Education and Culture (TKIK);

(ii) Fellowship programme and exchange of experiences for teachers and appropriate personnel in low-cost educational materials;

(iii) Distribution of references, publications and other informational materials on low-cost educational materials from several countries;

(iv) Exhibition of teaching materials, developed from the local resources, at the district, regional or provincial levels;

(v) Competition and incentives for teachers who have produced prototypes of low-cost materials with best values in design, cost and utilization; and

(vi) The national project be concerned with the designing and management of educational technology and low-cost/appropriate educational materials, while the provincial centres be responsible for the production and utilization of low-cost/appropriate educational materials.

NEPAL

The National Educational System Plan was introduced in Nepal in 1971. It had a tremendous impact on the people and created a climate of awareness. To attain the objectives of the Plan, administrative structures were changed with decentralizing the functions, operations and powers in the regions and districts. Owing to geographical factors, starting from the Himalayas to the plain, economic and physical constraints affect the nation. So the importance of various media and materials for the improvement of quality of teaching-learning and their potentiality in extending educational services was recognized by the new educational system. The urban areas are economically better off, but the rural and remote areas are facing the need for better educational equipment. Teachers are not well trained and even those with the minimum qualifications were utilized. Classroom facilities for the promotion of teaching-learning environment were established through the people's participation. In view of these limitations, teachers should be taught the methods and techniques of developing and using local indigenous materials for strengthening the educational system and promoting teaching-learning situations. The study visits programme gave the participants some valuable information and some of the techniques learnt could be utilized in the country.

Programme activities

1. To develop audio-visual programmes, with teacher's participation, placing greater emphasis on filmstrips, charts, photographs and graphic materials;

2. To improve the quality of the teachter with training programmes placing emphasis on self-reliance and work-orientation;

3. To develop educational materials using locally available resources and to produce textbooks at reduced costs;

4. To conduct national, regional and district-level workshops for teachers to assist them in promoting and improving teaching-learning situations as well as in the production and use of educational materials;

5. To distribute to distant places handbooks and learning packages prepared from locally available indigenous materials.

Comments and suggestions

The magnitude of the problems facing India with its huge population, diverse cultures and low literacy rate makes it unique amongst the countries visited.

The methods being used in an attempt to solve these problems are well planned and relevant. The specific projects commented on favorably by the participants are as follows:

(i) The Space Application Centre's model programmes for trial setellite TV transmission to 2,400 village schools and communities and their rapid development of indigenous technology and hardware;

(ii) The Centre for Educational Technology trial programme of teaching Hindi through daily broadcasts supplemented with flash cards, textbooks and student work books;

(iii) The National Institute of Design which is conducting degree courses in industrial design and visual communication but relating the courses directly to industrial requirements, both large and small scales;

(iv) The development of Vikram Sarabhai Community Science Centre as a unique institute giving scientific understanding to the common man through the process of discovery;

(v) The work of the State Institute of Education in curriculum implementation, development of non-formal education and the integration of population education into the education system;

(vi) The Centre for Educational Technology, development, with UNICEF assistance, of learning modules for school dropouts in centres established where the need is greatest and the use of teacher trainees to implement the scheme;

(vii) The Department of Teaching Aids now operating as a support for innovators and trainers as well as producing prototype materials;

(viii) The development of textbooks, manuals and guides by the staff of the Department of Science and Mathematics;

(ix) The development by CET of a teacher training programme in teaching primary science through a multi-media package of satellite/TV transmission, radio broadcast, printed material and enrichment activities. The trial process and the preparation of trainers before the programme was implemented were significant.

As with all previous country visits, many of the participants found difficulty in establishing the infrastructure, inter-relation-

ship and primary functions of all the institutions visited. This has not been due to any lack of orientation which has always been very thoroughly provided. It seems to be due to the difficulty, in a short space of time, of gaining an overview of the educational system and relating places visited to previously explained educational structures and programmes.

PAPUA NEW GUINEA

Prototype production

1. The production of prototype instructional materials required by the new syllabuses at all grade levels should be continued by the Production Centre for Educational Materials.

2. More emphasis should be placed on the testing, evaluation and modification of these materials through school trials and workshops for trainers and teachers.

3. Approved materials should continue to be issued to schools at the existing rate so that they will have at least the minimal aids necessary to implement the syllabus. This should be followed up in three ways:

   (a) By giving teachers and schools the opportunity to purchase additional items of equipment from the Centre;

   (b) In conjunction with the proposed development of Teachers Resource Centres, provide workshops to make similar or substitute aids from readily available low-cost and indigenous materials; and

   (c) After adequate trials and modifications of these low-cost aids, prepare a manual for teachers describing their production details and use.

Trials and evaluation

1. The Community School Mathematics Programme lists a large number of aids necessary for the implementation of the new syllabus. At present there is no school that has the full range of equipment.

It is proposed that a small number of easily accessible schools be provided with the optimum amount of equipment for 1980, and that the teachers in these schools be given adequate training in its use.

An evaluation should be made that will determine:

a) Material effectiveness and durability;

b) The possible use of cheaper alternatives;

c) The degree to which the materials actually do improve the understanding of concepts and mathematical ability;

d) Method of supply, repair, replenishment and retrieval of the materials during and after the trial;

e) Storage requirements; and

f) Best methods of packaging for distribution.

2. Select one existing teacher's guide and reproduce it in a shortened form and with more visuals. This will be issued to school inspectors, curriculum advisors and teacher's college staff, on trial, with the objective of assessing its effectiveness in presenting the main aims and concepts in a quickly comprehensible form for busy administrators and trainers.

PHILIPPINES

As a product of the APEID Inter-project and Inter-country Study Visits on Educational Technology, the Philippine participants have gained the following ideas/insights which could be of relevance to the realization of national development goals of the country:

1. The use of scientific and educational exhibits as in the Science Museum of Thailand and the V.Sarabhai Community Science Centre in India where the school children as well as out-of-school youths are provided experiences in the manipulation of educational learning materials from which they could discover of reinforce concepts in the different subject areas.

The aforementioned set-up could be adopted in the Philippines. In Metro Manila, for example, the existing exhibits in the National Science Development Board (NSDB), Rizal Park Planetarium, the Ayala Museum and the Manila Aquarium, could be merged and centrally managed to provide for more systematic and well-organized educational experiences for the Filipino youths.

2. Soliciting the involvement of experts and technical men of government and private agencies as the NCERT's work with the Space Application Centre and the National Institute of Design.

The Ministry of Education and Culture should seek the expertise and technical know-how of people from the Design Centre

Philippines for the preparation and production of quality educational materials. Cooperative linkages can also be established with the different agencies of the government like the Technological University of the Philippines, the University of the Philippines, the Educational Development Project Implementing Task Force (EDPITAF) and the National Media Production Centre.

3. The production linkage of Kurusapa Teacher's Association with that of the IPST and the CDC of Thailand is ideal.

The Ministry of Education and Culture should call on the cooperation of the Philippine Public Schools Teacher's Association (PPSTA) to start a similar project in the large-scale production of educational media materials. Projects of this type could mean income for the association which could then be divided among its members and at the same time help in upgrading education through the production of educational materials. This project could also mean the availability of relevant educational materials which the schools could purchase at a minimal price. Apart from these, such a project could promote and encourage further use of educational media materials in the classrooms for effective instruction.

SRI LANKA

Sri Lanka is already having a number of projects for the production and distribution of low-cost educational materials. These projects are similar to those observed in countries visited. However, a few innovations could be suggested to re-orientate and improve existing projects:

1. Teacher's organizations to be invited to get involved in the management of the Science Equipment Production Unit as in Thailand, where Kurusapa, a Teacher's Association, has undertaken the mass production of science equipment for the Ministry of Education, while designing, prototype making and testing of equipment are done by the Curriculum Development Centre and the Institute for the Promotion of Teaching Science and Technology, IPST. This set-up is functioning well and the costs of the equipment produced by Kurusapa is comparatively low.

2. Training in the production of low-cost instructional materials to be included in the pre-training of teachers in addition to the existing in-service training.

3. Existing facilities of the film division (audio-visual unit) of the Ministry of Education and the Curriculum Development Centre to be utilized for the production of filmstrips, 16 mm films and instructional charts etc.

4. The scope of the existing Field Study Centres to be extended to serve as Community Science Centres, where interested members of the community can participate in their activities. These Centres could also serve as non-formal or adult education centres.

5. Establishing well-organized science museums in districts or provinces for promoting the understanding of science technology by the common man.

6. Facilities already existing in the Curriculum Development Centre to be organized to function as a media centre for the production of low-cost instructional aids and for the in-service training of teachers in the preparation of low-cost instructional aids specially for primary grades.

THAILAND

1. Set-up seminar-workshops to introduce new ideas, methods, techniques, etc.;

2. Organize the exhibition of new teaching materials that have been developed from indigenous materials. The exhibition may be held at the school, district, provincial, regional and national levels;

3. Hand-outs, guidebooks, brochures on the development and use of educational materials must be published and distributed nation-wide;

4. Competition and prizes for the best exemplary teaching materials developed with the use of scraps or indigenous raw materials available in the area at the lowest possible cost;

5. New materials that have been developed must be tried out on an experimental basis in pilot schools to find out their relevance and effectiveness in the teaching-learning situation;

6. Local production or teacher-made materials should be promoted for teachers or other school key personnel through frequent

in-service training programmes at all levels of education. Curriculum personnel, educational supervisors and university and teachers' college resource persons should be drawn in to assist in the programmes. This should also be undertaken in the area of utilization of the materials. Moreover, manuals exhibitions, demonstrations and school visits can also be used effectively. The existing radio and television networks must be included for the task;

7. Schools or a group of schools should establish their effective central service centre under the responsibility of a trained educational technologist provided by universities and teachers' colleges;

8. Feedback system should be established so that at each level of authority the organization concerned will benefit in re-adjusting itself for better manipulation of the process;

9. Research work especially in the CDC should take active action on every phase of design, development, utilization and dissemination of the educational materials;

10. The introduction and promotion of new materials and methods of instruction for the teachers should be made by the Instructional Aids and Curriculum Innovations and Development Unit. Modules, programmed text, instructional or learning packages, learning centre classroom, methods of self-discovery and the like should be prepared for teachers.

CHAPTER V

CONCLUSION

The following were comments and suggestions made by the twelve participants from nine participating countries towards the further improvement of this APEID project:

1. It is agreed that one-week study visit per country is enough, and that the visits be limited to three countries.

2. To provide a better understanding of the projects, write-up of the projects and institutions to be visited should be provided to the participants well before the actual visit. The Unesco Regional Office should also receive the same write-ups for comments and proper monitoring of the activities.

3. The schedule of country visits should include a meeting or briefing in each country after all the projects and institutions have been visited by the participants to allow group evaluation and group discussion of what has been visited.

4. Unesco should monitor activities of participating countries subsequent to each in-project and inter-country study visit.

ANNEX I

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